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MEXICAN FRUIT FLY

A Situation Report

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MEXICAN FRUIT FLY -- A SITUATION REPORT

First evidence that the Mexican fruit fly, a pest that prefers citrus but attacks other fruits as well, had moved into southern California came the second week in August when a live female fly was trapped in San Ysidro, San Diego County. San Ysidro adjoins the Mexican city of Tijuana, Baja California.

Soon after the fly was found, the California Department of Agriculture placed a part of San Diego County under quarantine. (See map.) No fruit that might be infested by this pest can be moved from the area without the approval of California Department of Agriculture plant pest control officials. The quarantine action is one phase of the defense against the further spread of the Mexican fruit fly.

The discovery of the fly at San Ysidro was not surprising. Federal and State control officials had been alert to a possible invasion since January, when the first of several flies was discovered across the border near Tijuana. Promptly following the initial finding in Tijuana, the United States Department of Agriculture's Plant Pest Control Branch, which was already carrying on a cooperative control program with Mexico, concentrated traps containing a lure on the Mexican side of the border. Similar action in cooperation with California and Arizona Departments of Agriculture was inaugurated north of the border. Several flies were caught, most of them in the Tijuana area. Others were trapped, however, across the border from Calexico, Calif., at the southern entrance to the Imperial Valley, and at Ensenada, about 100 miles south of Tijuana.

In the meantime, additional inspectors had been added to the plant quarantine inspection staff at border ports of entry; pest survey work was intensified on both sides of the border, and spray programs aimed at eradicating the pest were begun.

Repeated surveys in the immediate areas where the flies were trapped failed to reveal the presence of larvae. However, three empty pupal cases were found in soil screenings, which indicated that some flies had gone through at least part of their life cycle there. U.S. Department entomologists then assumed the presence of a light infestations in the border area.

The mature Mexican fruit fly is considerably larger than the housefly. The female has a sharp ovipositor about as long as its body. This needle-like organ deposits eggs beneath the rind of the host fruit. Larvae hatched from these egg clusters do the damage, feeding upon the fruit for about 6 weeks. Infested fruit shows premature color and breaks down internally as the growing larvae feed. Heavily infested fruit usually drops to the ground before the larvae mature. The larvae go underground to pupate and emerge as flies. The fly can produce four generations a year or more under favorable conditions.

MEXICAN FRUIT FLY CONTROL

The Mexican fruit fly infests both grapefruit and oranges, but shows a strong preference for grapefruit. Lemons, interestingly enough, are too sour. In Mexico it also attacks such deciduous fruits as peaches, pears, and apples. Its favorite subtropical hosts are mango, white sapote, and the wild yellow chapote.

LONG A NUISANCE FOR TEXAS CITRUS

While this is the first known appearance of the Mexican fruit fly in California, citrus growers in the Rio Grande Valley of Texas have known it well since 1927. Beginning very late in the fall or in the winter, the fly moves into the valley from its native northeastern Mexico to infest the grapefruit and orange groves. Few other host plants grow in the valley. The infestation usually reaches a peak in March or April, then disappears by early summer after the citrus crops are harvested. Because of the new invasions each year, eradication in the Rio Grande Valley is impractical.

TEXAS LOSSES COMPARATIVELY LIGHT

The Mexican fruit fly usually causes comparatively light damage in Texas, in part because of the absence of certain wild fruits that serve as reservoirs of infestation in some parts of Mexico, in part because of the lack of a succession of favored cultivated fruits, and in part because the citrus crop is harvested each season usually before the pest has a chance to build up a heavy infestation in the crop through successive generations.

Texas citrus growers, however, are required by quarantine regulations to apply a vapor-heat treatment to much of the fruit, especially grapefruit, after infestations have been found, to prevent the pest from spreading to other fruit-growing areas. The treatment, devised by U.S. Department scientists, kills any overlooked larvae or unhatched eggs. As a rule this extra handling of the fruit costs more than the damage done by the insect, and becomes an additional marketing expense. Under some conditions of fruit-handling processes, the vapor-heat treatment has been reported to cause some damage to the fruit.

DIFFERENT IN CALIFORNIA

If the pest should become established in northwestern Mexico and southern California, both U.S. Department and California control officials believe that losses would be much greater than those sustained in Texas, because conditions in California are more similar to those in Mexico where the fly is most destructive.

Unlike the Rio Grande Valley, California produces citrus the year around and grows a wide variety of other fruits, such as apples, pears, and peaches, that might prove attractive to the pest. Valencia oranges in particular could support a fruit fly population at a time when the pest normally is building up to a peak infestation. Valencias mature in May but often stay on the trees through late fall awaiting a favorable market.

COOPERATIVE SPRAY PROGRAM BEGUN IN BORDER AREA

When the first fly was discovered near Tijuana in January and the intensified survey revealed the presence of light infestation, spray programs were started on both sides of the border.

On the Mexican side representatives of the U.S. Department's Plant Pest Control Branch cooperated with Mexican officials in setting up and carrying out a spray program on all known host fruit trees within an area reaching as far below the border as Ensenada. Susceptible fruit trees are sprayed with a tartar emetic solution every third week.

A similar spray program in cooperation with the California Department of Agriculture has been under way in lower San Diego and Imperial Counties since May. There are few commercial plantings of citrus on either side of the border in the Tijuana-San Ysidro area, but backyard "patio" plantings abound. On the California side some 20,000 trees are sprayed regularly on 3,000 properties.

The triweekly spray program in the Mexicali-Calexico area, which was halted in July, was resumed in October. This break in the spray schedule was possible because there are few if any known host fruits available to the pest during the late summer.

LONG-TIME COOPERATION WITH MEXICO

The U.S. Department of Agriculture has been cooperating with the Mexican Secretaria de Agricultura on the fruit fly problem since shortly after the insect was found in Texas in 1927.

As communication and travel developed in Mexico, the fruit fly made its way to the West Coast of Mexico. At first it was found only as far north as Culiacan, Sinaloa, but it has since moved or has been carried steadily northward. The present threat in California stems from this movement. In 1953 the fly was found in Hermosillo, Sonora, only a little more than 100 miles below the Arizona border. This area recently has been linked by highway and rail transportation with the extreme northwest part of Baja California, formerly cut off by desert. Shipment of subtropical fruits, particularly mangoes, became a part of the commerce developing over these new routes.

Foreseeing a possible invasion route for the fly, the U.S. Department assisted Mexico in establishing and maintaining a highway control point at San Luis, Sonora, where mangoes, or any other host fruits, could be given an ethylene dibromide fumigation. In addition, Mexican authorities now inspect train baggage of passengers traveling north at Enpalme, Sonora; fumigate railway and baggage cars carrying fruit at Benjamin Hill, Sonora; and inspect all baggage and cargo arriving off northbound planes at Ensenada, Mexicali, and Tijuana.

MORE RESEARCH NEEDED

Experience in Texas and Mexico has established a broad knowledge of the pest and its habits. Research also has provided a partial means of preventing spread in the form of a treatment for fruits to be shipped from quarantine zones. But we do not have exact knowledge of what damage the pest can wreak under the mild climate of the western coastal region.

Department scientists, in whose effort California has joined, are seeking to answer the question of climatic influence. Research work was initiated in August at Brownsville, Texas, in which bio-climatic cabinets are being used. These cabinets enable the scientist to duplicate temperature, humidity, and possibly other factors of climates in various areas of California and other parts of the United States.

With the aid of the University of California, U.S. Department scientists recently have developed a satisfactory artificial medium for rearing larvae, and also techniques for obtaining large populations of flies from the resulting puparia so that flies will be available for the studies conducted in the cabinets, as well as for other research purposes.

The effort to develop baits and lures more attractive to the fly has been resumed. Improvements in this field would make it possible to detect existing infestations at earlier stages and thus aid in eradication. More attractive baits also could make toxic sprays more effective. The baited spray used at present--made up of 4 pounds of tartar emetic (the toxic agent) and 20 pounds of refined sugar (the bait) in 100 gallons of water--is safe to handle by those applying it. It does a fairly effective job. Emerging flies are attracted to the foliage of the host trees where they feed on the honeydew and wild yeasts on the under surfaces of the leaves for about 2 weeks until they reach the egg-laying stage. As long as residual quantities of spray remain on the leaves there is little chance of the flies surviving. Nevertheless, migrating flies could lay a few eggs in the fruit even in trees that are sprayed regularly.

Some of the newer insecticide formulations, which are much more toxic to flies, show considerable promise for improved bait sprays. Preliminary studies show that one of the phosphates, malathion, together with one or another of the protein hydrolysates, is an effective spray. It attracts flies and kills those that feed on it. Malathion is less hazardous to use than the more toxic parathion, but, like any highly toxic material, it must be handled with extreme care. Studies also have been conducted with several chlorinated hydrocarbons, but these materials have shown no marked improvement over the tartar emetic spray now in use.

The vapor-heat treatment of fruits grown in quarantine areas guarantees no survival of the pest, and is adequate to prevent its spread. However, the treatment is not always satisfactory to citrus growers. Some types of fruit other than citrus will not stand up after the vapor-heat treatment. Further studies, particularly on fumigants such as ethylene dibromide, are continuing.

THE OUTLOOK IS FAVORABLE

Whether or not the pest can be eradicated won't be determined for several months or perhaps years. The answer can come only after repeated spraying of host trees, together with a continuing survey. All entomologists cooperating in the work--Mexican, U.S. Department of Agriculture, Arizona, and California--agree that the key to the problem lies in the progress made in northwestern Mexico. If the pest can be eradicated there, it can be eradicated in California. If it cannot be eradicated in northwestern Mexico, there will be no way to prevent infestation of susceptible fruit trees in southern California. Then the problem would be to live with the pest.

One of the more favorable aspects of the present program is the successful pattern of cooperation between Mexico and the United States. Interest of fruit growers, as shown by their willing participation in the enforced spray programs, is another favorable factor. Since attitudes stand next in importance to knowledge of the pestilence, those concerned with the eradication of the fruit fly from the newly infested area feel that the job can be done.